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DEFENSE INTELLIGENCE REPORT

CHINA'S AIRBORNE PHOTORECONNAISSANCE CAPABILITY (U)

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CHINA'S AIRBORNE PHOTORECONNAISSANCE CAPABILITY (U)

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PREFACE

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CONTENTS

	Page
SUMMARY	vii
1. INTRODUCTION	1
2. PHOTORECONNAISSANCE FORCE	1
a. Organization/Disposition	1
(1) Command and Control	3
(2) Tasking Authority	3
b. Photoreconnaissance Equipment	3
(1) Reconnaissance Platforms	3
(2) Camera Systems	6
(3) Exploitation and Dissemination	8
(a) Base Processing	8
(b) Mobile Processing	9
c. Tactics	10
(1) Protection of Reconnaissance Aircraft	10
(2) Tactical Photoreconnaissance	10
(3) Strategic Photoreconnaissance	12
d. Operational Training	12
(1) Unit Level	12
(2) Exercise Activity	13
e. Operational Experience	14
(1) Taiwan Strait Operations	14
(2) Xisha Islands (Paracels) Operations	14
(3) Sino-Vietnamese Border Conflict	15
3. FUTURE DEVELOPMENTS/REQUIREMENTS	16
a. Aircraft	16
(1) MiG-21/FISHBED	17
(2) XIAN-A	18
(3) Remotely Piloted Vehicles (RPV)--Drones	18
b. Camera Systems	20
c. Processing and Exploitation	20
4. CONCLUSION - CAPABILITIES ASSESSMENT	21

ILLUSTRATIONS

Figure	
1. Force Development	2
2. MiG-19/FARMER--Photoreconnaissance Variant	4
3. Il-28R/BEAGLE with Bomb Bay Cameras	4
4. An-30/CLANK and Twin Otter Aerial Survey Aircraft	5

SUMMARY

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~~(S/NOFORN/WNINTEL)~~ Extensive [redacted] associated camera systems provided information on the capabilities and limitations of China's airborne photoreconnaissance resources. New data base inputs indicate that previous assessments of the size and capabilities of the Chinese photoreconnaissance force were optimistic. An analysis of available technical reports on China's photoreconnaissance equipment and known operating procedures shows that China's strategic photoreconnaissance capability is almost nonexistent, and that its capability to conduct tactical air reconnaissance is only marginal when likely tactical situations are considered. This capability is characterized by obsolescent camera systems, time-consuming processing and evaluation methods, and airborne platforms whose probability of surviving in a high-threat environment is very low. Photoreconnaissance requirements during combat operations where the air defense environment is minimal, as in the recent China-Vietnam conflict, would probably have a high rate of success. Suffering from both a lack of near-real-time interpreting capability and highly vulnerable airborne collection platforms, China's tactical reconnaissance capability is significantly reduced against a highly mobile enemy with sophisticated defenses such as the Soviet Union. Apparently aware of these deficiencies, the Chinese have embarked on a program to upgrade tactical photoreconnaissance systems. New developments range from higher performance platforms to better camera systems and most likely include improved processing equipment and methods. When widely deployed, these new systems should somewhat improve aircraft survivability and result in a faster cycling time for photo intelligence products. However, for the near term China's tactical photoreconnaissance capability will continue to be limited by the 1950s technology of its existing systems.

(1) Command and Control

~~(C/NOFORN)~~ All air force units, including IRs, are subordinate to PRCAF Headquarters in Beijing (Peking). Operational control of most units, however, is maintained by the Air Force Command (AFC) of the military region where assigned. During emergency conditions, Air Force Headquarters could assign missions directly to any air force unit without notifying the AFC of a military region; however, the bypassing of the chain of command is not a common practice.

(2) Tasking Authority

~~(C/WNINTEL/NOFORN)~~ Photoreconnaissance tasking authority is held by two command authorities: The Reconnaissance Division, Intelligence Department, PRCAF Headquarters, and the Reconnaissance Section, Intelligence Department, Air Force Command of a military region. Independent regiments are normally tasked by the AFC of the military region. National-level authorities seldom task reconnaissance units directly. Generally, reconnaissance mission tasking is issued by written instruction. The tasked unit is authorized to request additional guidance by telephone, if necessary. In emergency situations, reconnaissance missions can be levied by telephone; however, these cases are also rare. When ground or navy units require reconnaissance support, they request it through channels to the AFC of the military region or to the fleet area command. The AFC's Reconnaissance Section is responsible for processing the request, mission planning, and target assignment.

b. Photoreconnaissance Equipment

(1) Reconnaissance Platforms (b)(1)

~~(S/NOFORN)~~ The principal reconnaissance aircraft used by the PRC is the MiG-19/FARMER (Chien-6) (figure 2). [redacted] The reconnaissance MiG-19 apparently has only one hardpoint on each wing where auxiliary fuel tanks are attached. [redacted] A sizable number of MiG-17/FRESCO (Chien-5) and MiG-15/FAGOT (Chien-4) aircraft also remain in the photoreconnaissance inventory, although they are used primarily for reconnaissance training. The other principal aircraft used in a photoreconnaissance role by the Chinese is the Il-28R/BEAGLE (figure 3). The Il-28R's navigation equipment, larger crew, and variety of camera systems makes it suitable for both day and night missions, overwater reconnaissance, and reconnaissance of larger targets such as cities and industrial complexes.

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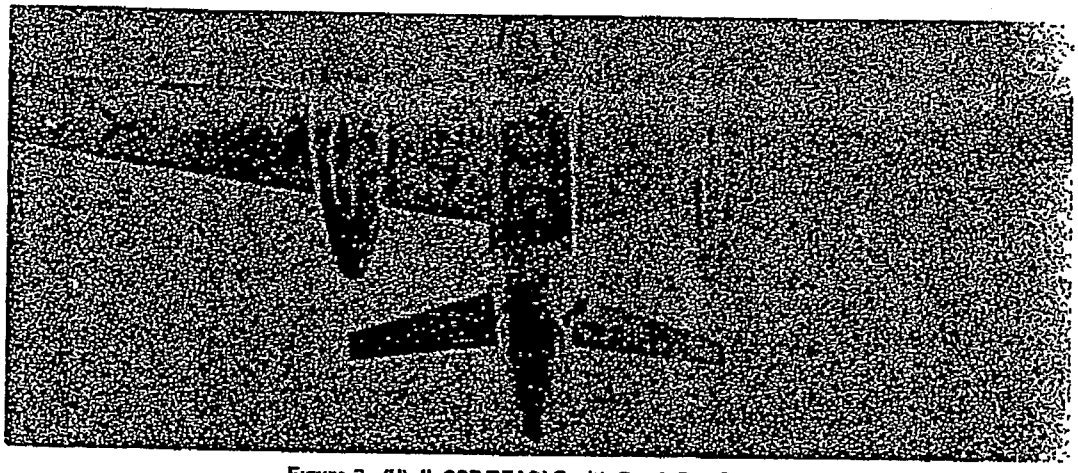

Figure 3. (U) IL-28R/BEAGLE with Bomb Bay Cameras.

~~(S/NOFORN)~~ China also has eight Soviet-built An-30/CLANK and four Canadian-built Twin Otter photo survey aircraft in its military and civil inventories (figure 4). Recently the use of helicopters to conduct photo survey operations has been noted. Because of their low probability of survival in a tactical environment and the lack of a discernible tactical mission, no further attention will be afforded these systems.

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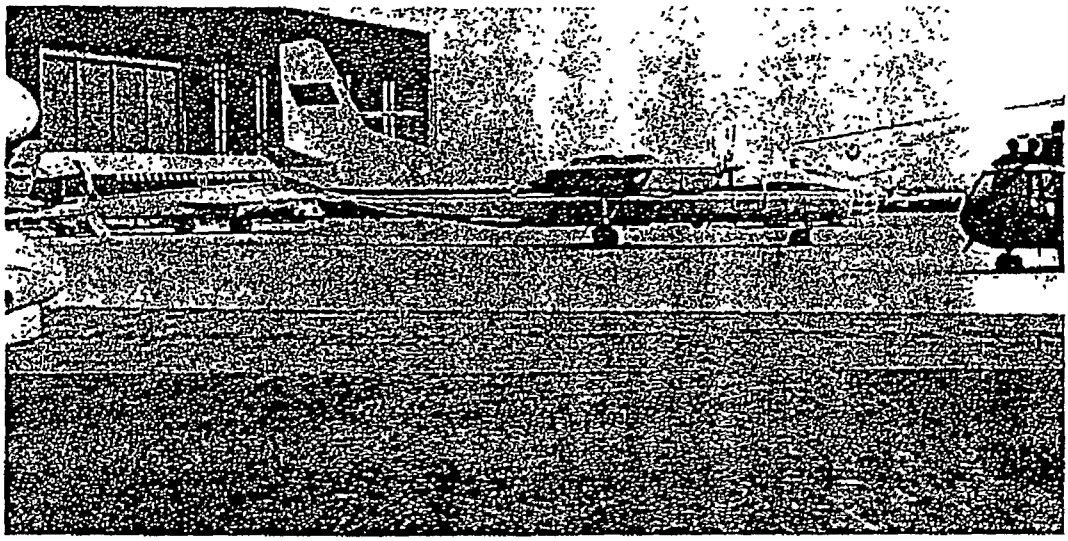

An-30/CLANK

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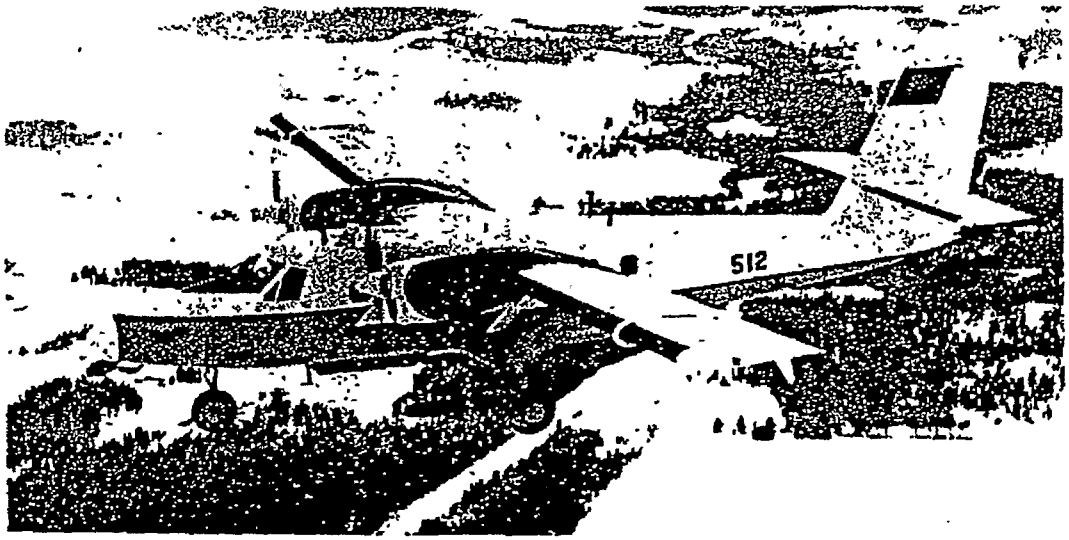

Twin Otter

Figure 4. (U) An-30/CLANK and Twin Otter Aerial Survey Aircraft.

TABLE 1

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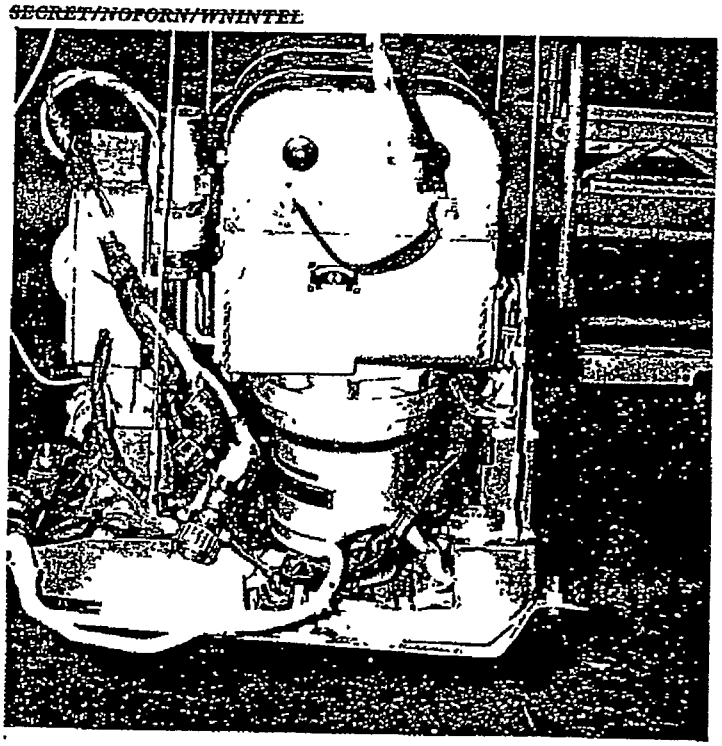

Figure 5 (U) Hang Chia 13-40 Camera System.

(3) Exploitation and Dissemination

(a) Base Processing

~~(C/WNINTEL/NOFORN)~~ Film exploitation is performed by the IR's organic Air Photographic Service Group (APSG). Each group consists of 70-80 personnel, including approximately 10 photointerpreters (PIs), and is organized into three squadrons: a developing squadron, a mosaic squadron, and an interpreting squadron. Once mission aircraft land, ground personnel remove the film from the aircraft and deliver it to the APSG. It normally takes an hour to develop the film. Four additional hours are required to print and make a mosaic before photointerpreters are able to perform readouts and/or analysis (figure 6). According to Fan, the shortest time that film can be processed is 3 hours. The X-10 camera system requires at least 10 hours to perform the same process.

~~(C/WNINTEL/NOFORN)~~ Time-sensitive requirements result in the PIs using negative or film positive to perform their analysis; otherwise the mosaic is the PI's primary tool. Photointerpretation reports are submitted to the IR commander through the regiment's Reconnaissance Squadron. The IR commander forwards the report upward to the Air Force Command (AFC) at the military region level. The AFC disseminates the product to the requesting organization as applicable.

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Figure 6. (U) Photo Exploitation.

(b) Mobile Processing (b)(1)

~~(S/WNINTEL/NOFORN)~~ [redacted] the 2d IR has four 10-wheel, enclosed-body, mobile air-photo service trucks (figure 7). Other IRs are not known to have these types of trucks. The trucks are used when the IR is deployed to bases where photo service facilities are nonexistent or below operational requirement standards. Reports indicate that thus far there has been little call for the services of the vans. Operating in pairs, one truck is used for processing and developing the film, while the other is used for constructing mosaics and for interpretation. A photo search of all known 2d IR-associated home and deployment bases failed to turn up the vehicles. It is likely that they are stored in garages or in underground storage facilities. If processing facilities are not available at deployment bases, or if a mission aircraft must land at an airfield other than its assigned base, aircraft are dispatched to rush time-sensitive film to the APSG for processing and exploitation. Dissemination of photo readouts/reports to the AFC is normally accomplished by using ground transportation. Time-sensitive reports are reportedly flown to higher headquarters as necessary. It is likely that other means of communications, such as landline, radio, and teleprinters, are also used to expedite the flow of important information.

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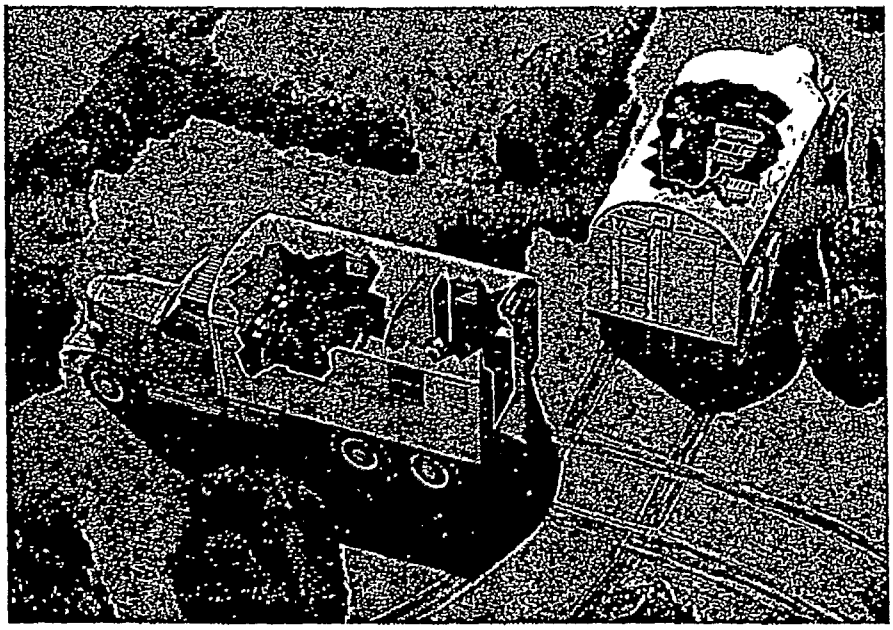

Figure 7. (U) Photo Processing and Exploitation Vans.

~~(C/WNINTEL/NOFORN)~~ A normal deployment of a reconnaissance element (six aircraft) is accompanied by a team of three camera technicians and 12-15 developers, processors, and photointerpreters. These teams are capable of providing the deployed element and the command authorities with the same level and quality of support as the base unit. This support team could be augmented if mission requirements necessitate.

c. Tactics

(1) Protection of Reconnaissance Aircraft

~~(C/WNINTEL/NOFORN)~~ The primary responsibility of the reconnaissance pilot is the accomplishment of the assigned mission. Although the MiG-19 reconnaissance variant is armed with guns, the engagement of enemy aircraft is avoided whenever possible. During periods of hostilities, reconnaissance aircraft are escorted to the target by combat aircraft. The escort aircraft position themselves to draw off any reacting enemy forces, allowing the reconnaissance mission to be accomplished. As with normal fighter-interceptor operations, combat air patrol (CAP) activity in support of reconnaissance missions is conducted under strict ground control. Usually escort and reconnaissance aircraft are from the same base. Normal operations have the escort aircraft taking off first and being joined by the mission aircraft at a predetermined rendezvous. Both groups are briefed separately prior to the mission; there is no communication between mission aircraft and their CAP during the mission. All coordination is preplanned. A proposal has been circulated by PRCAF Headquarters which calls for organizing reconnaissance and fighter aircraft into the same unit. A well-trained escort unit assigned to an IR would afford greater flexibility and enhanced coordination in the conduct of tactical reconnaissance operations. To DIA's knowledge, this concept has not been operationally adopted.

(2) Tactical Photoreconnaissance

~~(C/WNINTEL/NOFORN)~~ Tactical reconnaissance is characterized by the requirement for time-sensitive information on the composition and disposition of enemy forces. The Chinese use two basic flight profiles to collect this type of information: the high-medium-high and the medium-high-medium profiles (figure 8). These missions normally take 30-40 minutes to complete. A great deal of flexibility is allowed in profile selection and altitude determination; however, the characteristics of enemy radars and ground-based air defense are planning factors which weigh heavily on these selections. Reconnaissance flights are generally conducted by two or four aircraft. Missions using six reconnaissance aircraft have also been reported. Single aircraft missions are flown when the tactical situation dictates.

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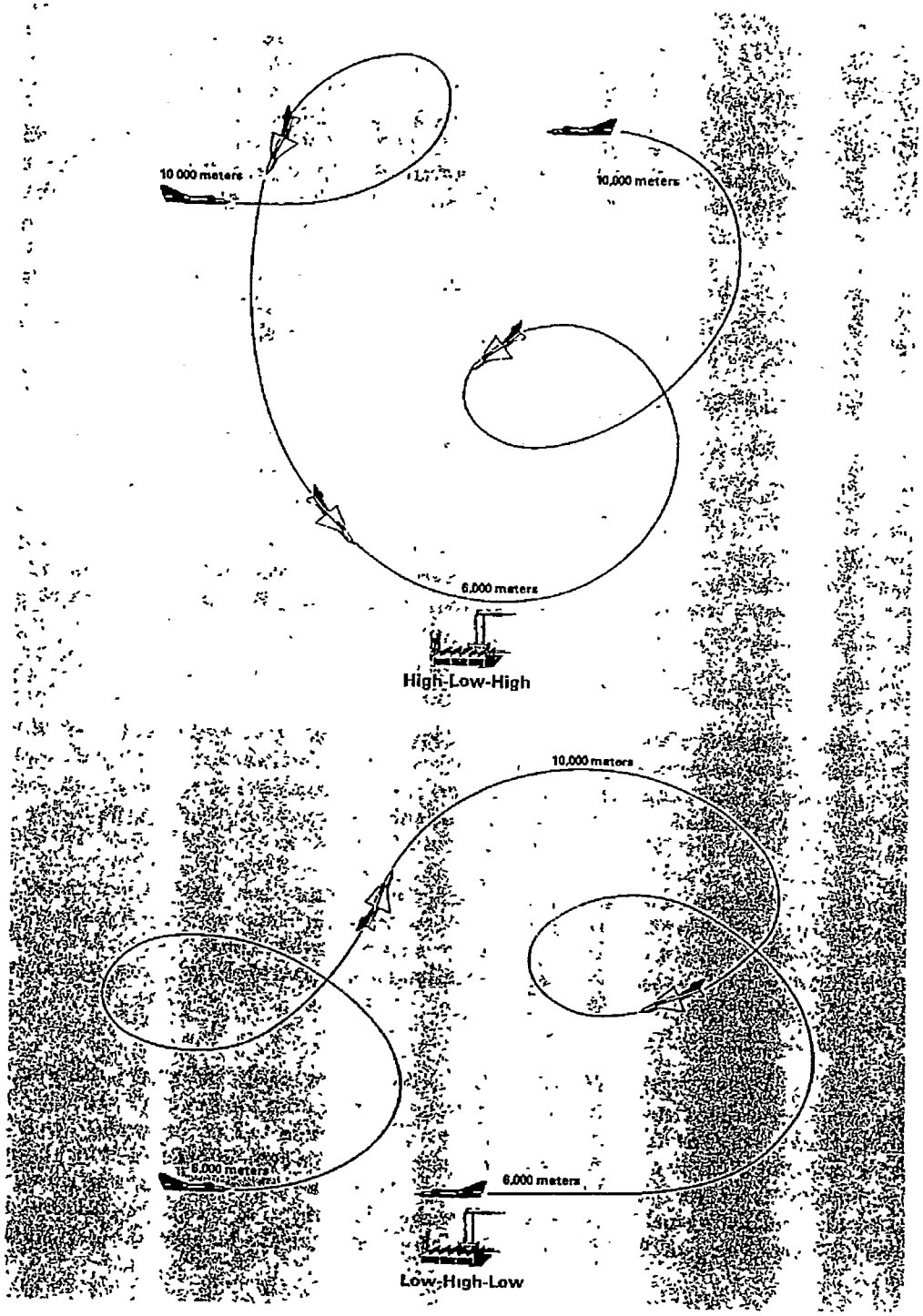

Figure 8 (U) Reconnaissance Mission Profiles.

(3) Strategic Reconnaissance

~~(C/WNINTEL/NOFORN)~~ The PRC, by Western definition, does not have a strategic reconnaissance capability. It does, however, have a force which can provide--or has the inherent capability to provide--information on targets defined as targets of strategic interest. The only tactical aircraft in the Chinese inventory with the range capability to conduct strategic reconnaissance are the Tu-16/BADGER and Be-6/MADGE. However, neither aircraft has been reported flying strategic missions or training for them.

d. Operational Training

~~(C/WNINTEL/NOFORN)~~ The Military Training Department (MTD) of PRCAF Headquarters is responsible for all reconnaissance unit training. An annual training outline is prepared by the department and forwarded to the reconnaissance units. Based on this outline, the IR prepares a detailed training schedule by subject and numbers of hours and forwards the schedule to the MTD for final approval. Upon MTD approval, the reconnaissance units carry out the program. The training department of the Air Force Command in the military region has no operational or planning responsibilities for reconnaissance training. The AFC, however, monitors the program and provides an evaluation of the training.

(1) Unit Level

~~(C/WNINTEL/NOFORN)~~ The annual training program, depending on seasonal constraints, alternates between reconnaissance training days and political training days. During the course of a normal training year, a reconnaissance pilot can expect to receive 50-60 flying hours. The schedule is flexible in that reconnaissance training is replaced by political indoctrination on days when flying is restricted by bad weather. However, all MTD-approved training must be completed within

the scheduled training cycle. Once a pilot finishes formal flight training and is assigned to a reconnaissance unit, he is required to complete a 3-year unit training program before being assigned operational missions. This 3-year transition program consists primarily of reconnaissance and combat flight profile missions (150-170 hours); academic instruction, including combat theory (60 hours/10 hours); instrument theory; and foul-weather penetration flights. A majority of the flight activity during the first 2 years of the transition phase is conducted in MiG-15/17 aircraft. Third-year training is conducted in the MiG-19. Much of the subject matter, especially flying techniques, is progressive in nature and pilots are tested before entering the next phase of training. A pilot is retrained in areas where he fails to meet the minimum standards. The third year of this program emphasizes airborne photographic techniques. Since the Chinese Air Force places great emphasis on flying skill, a waiver is sometimes granted pilots who are unable to finish the required classroom instruction.

~~(C/WNINTEL/NOFORN)~~ Another aspect of the unit-level training program includes foreign aircraft and equipment recognition. Generally, target recognition classes use pictures and models of military equipment and installations as training aids. Air Force Headquarters has sponsored orientation trips for some reconnaissance pilots to selected Chinese military facilities, such as SAM sites and naval bases; however, this does not appear to be a common practice.

(2) Exercise Activity

~~(C/WNINTEL/NOFORN)~~ The decision to conduct joint-service exercises is made by the Military Affairs Commission. The military region responsible for conducting the exercise is required to formulate and submit the exercise plan to the Military Affairs Commission for approval. The joint-service exercise is then executed by the military region. Prior to the multiservice exercise, the commanding officers and key staff members of the units that are to participate in the exercise, including the reconnaissance support element, attend a coordination meeting arranged by the MR commander.

~~(C/WNINTEL/NOFORN)~~ An IR is capable of deploying up to five photoreconnaissance detachments simultaneously. Generally, however, only one detachment is deployed at a time for exercises. The deployment of one detachment does not disrupt normal operations at the IR's home base. Detachments consist of three to six aircraft, usually six. When six aircraft are deployed, they are accompanied by 18-24 maintenance personnel and the normal complement of photo and camera technicians.

~~(C/WNINTEL/NOFORN)~~ Normally, an exercise rehearsal is conducted the day before the formal exercise. The rehearsal is basically the same as the exercise with the exception that no live ammunition is used. During the formal exercise, the detachment both simulates enemy aircraft conducting pre-attack missions and performs reconnaissance missions in support of friendly forces. Damage assessment missions are conducted during the later stages of the exercise. Exercise monitors also use aerial photos to judge the success of friendly forces in the conduct of the operation. As many as 40 photoreconnaissance sorties are flown in support of an exercise.

e. Operational Experience

~~(C/WNINTEL/NOFORN)~~ Since 1949, China has had few opportunities to employ its photoreconnaissance resources in support of operations against hostile forces. The PRC was not known to have had a photoreconnaissance capability during the Korean conflict. During the 1964 Sino-Indian border clashes, the terrain in Tibet precluded these types of tactical operations. The best cases to illustrate the employment of China's tactical reconnaissance forces are operations in the Taiwan Strait (1958 and 1977), the Xisha (Paracels) operation (1974), and the Chinese incursion into Vietnam (1979).

(1) Taiwan Strait Operations

~~(C/WNINTEL/NOFORN)~~ The 2d IR, in support of combat operations during the 1958 Taiwan Strait crisis, flew two photoreconnaissance missions over the Nationalist-held island of Chinmen. The first mission consisted of six photoreconnaissance MiG-15 variants escorted to the target by eight fighter aircraft. The second mission also consisted of six reconnaissance aircraft, but the escort was increased to 16 fighters. The CAP for the second mission engaged and drew off a flight of Nationalist jet aircraft, thus allowing the mission aircraft to photograph the target. Information concerning these encounters remains sketchy; however, the photoreconnaissance activity most likely was target acquisition/damage assessment related during the period of 23 August to 4 October when the People's Liberation Army (PLA) shelled Chinmen with over 440,000 artillery rounds. The most recent photoreconnaissance activity in the Strait area occurred during 1977, when MiG-19 aircraft flew missions in support of Chinese salvage operations on the sunken Japanese ship Awa Maru.

(2) Xisha Islands (Paracels) Operations

~~(S)~~ The Xisha Islands, consisting of the Amphitrite and Crescent Groups, are located approximately 180 NM southeast of Hainan Island. Since the mid-1950s, the two groups have been continually

occupied, the PRC in the Amphitrite group and the Republic of Vietnam (RVN) in the Crescents. Conflicting territorial claims resulted in the PRC extending its control over the Crescent group by military force in January 1974. (b)(1)

~~(C/WNINTEL/NOFORN)~~ To provide photographic support for command authorities and air and surface forces involved in this operation, the 2d IR was tasked to send six MiG-19 photo variants to the area. [redacted] Operating from Lingshui Airfield, on the southern tip of Hainan Island, the six photoreconnaissance aircraft flew approximately 50 missions over the Xishas, or 8 percent of all flight activity detected during the campaign. Fighter protection for the reconnaissance aircraft, with the exception of one mission, was not provided. It was determined after the initial mission that the probability of a hostile Vietnamese reaction to these flights was low, and CAP activity was terminated. (b)(1)

~~(C/WNINTEL/NOFORN)~~ Advanced air control teams were established to facilitate the control of air forces involved in the operation. This was necessary because the distance between Hainan Island and the Xishas made normal radio transmissions difficult. [redacted] Photomaps and photointerpretation reports were forwarded to this command. Reconnaissance missions were flown by the 2d IR up to the time it returned home in May.

(3) Sino-Vietnam Border Conflict

~~(S/WNINTEL/NOFORN)~~ To provide photoreconnaissance support for the massive Chinese air and ground forces buildup along the Sino-SRV Vietnamese border, elements of three IRs were deployed to southern China. Air activity during the conflict reportedly was limited primarily to defensive air patrols in the border area and reconnaissance of the border area, the Gulf of Tonkin, the South China Sea, and over the Xishas. An actual breakout of the activity that is photo-related is impossible; however, some reports do indicate that PRCAF aircraft were involved in target acquisition and damage assessment activity. The level and type (visual or photo) of this activity remains to be determined; but based on the availability of photoreconnaissance aircraft, past experiences,

and deficiencies in Chinese tactical communications, it is very likely that China made use of its airborne reconnaissance resources during the conduct of operations against the SRV.

3. FUTURE DEVELOPMENTS/REQUIREMENTS

~~(C)~~ For the near term, China will continue to rely on the FARMER and BEAGLE photoreconnaissance variants to meet its tactical needs. The F-9/FANTAN fighter-bomber could also be used in the role (figure 9). The performance characteristics of this aircraft are similar to those of the MiG-19; however, it is believed that some F-9s have a bomb bay which would allow some flexibility in camera configuration. The use of Tu-16/BADGERs for maritime reconnaissance is also expected. Chinese developments in the area of photoreconnaissance probably will be most influenced by the mobility potential of likely adversaries, specifically by the large Soviet mechanized and armor force along their northern border. The need for a more responsive photoreconnaissance system should impact on development of new camera systems and platforms, as well as improved processing and exploitation procedures.

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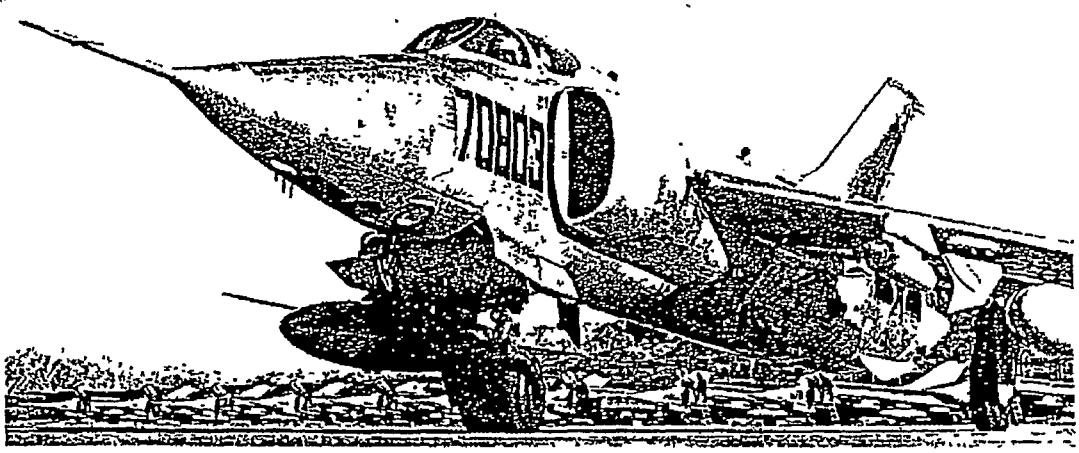

Figure 9. (U) F-9/FANTAN.

a. Aircraft

~~(S/WNINTEL/NOFORN)~~ Two interrelated factors impacting heavily on the development of photoreconnaissance aircraft in a modern warfare environment are platform survivability and mission speed. Presently

the Chinese have three platforms, either operational or under development, which have potential for photoreconnaissance vehicles and offer one or both of these capabilities. They are the MiG-21, the XIAN-A, and remotely piloted vehicles (RPV).

(1) MiG-21/FISHBED

~~(S/WNINTEL/NOFORN)~~ There are reports indicating that the Chinese are in the process of developing a MiG-21 photoreconnaissance variant (figure 10). The only major problem area the Chinese are likely to encounter in the endeavor would be the designing of a mid-line camera pod. Once the mid-line camera pod is designed, there would be a trade-off in terms of aircraft range and capability. The greater speed of the MiG-21 offers increased probability for platform survivability over the battlefield and reduced mission time. Later models of the MiG-21 are used in a photoreconnaissance role by several Eastern European Communist countries, including the Soviet Union. These versions use a mid-line camera pod system. Presently there are over 70 MiG-21s in the PRCAF inventory, and production continues at a rather erratic rate. There are reports that MiG-21s are being programmed to phase out the older MiG-17/19s from the photoreconnaissance inventory. This could be realized in the next few years, particularly if the XIAN-A is widely deployed in an air defense role.

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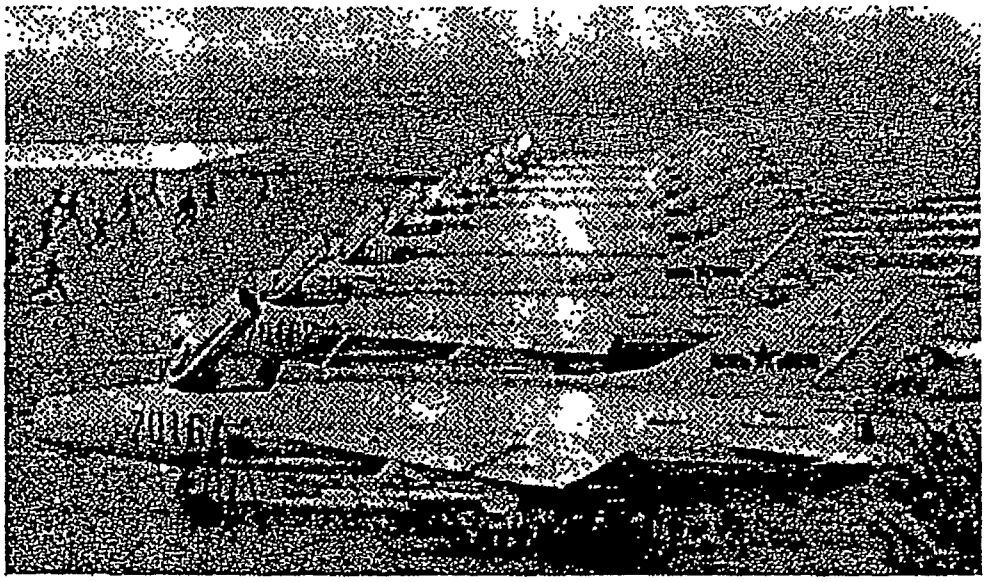

Figure 10. (U) MiG-21/FISHBED.

(2) XIAN-A

~~(S/WNINTEL/NOFORN)~~ The XIAN-A, China's indigenously designed, high-altitude, high-speed, delta-wing fighter, has been under development since the 1960s. Recent reports suggest that this aircraft is in final stages of development. It could enter series production at any time and be deployed as a high-altitude interceptor. The Mach-2 plus aircraft could be used as a reconnaissance platform; however, there is no evidence that such a role is intended for this aircraft. Significantly larger than the MiG-21, the XIAN-A would most likely be configured with internal camera systems if it were used in a reconnaissance role. With external fuel and forward deployment, most major target complexes in Asia and the Soviet Far East would be included in the aircraft's range. This airframe would clearly enhance the Chinese tactical photoreconnaissance capability if used in such a role.

(3) Remotely Piloted Vehicles (RPV)—Drones

~~(S/WNINTEL/NOFORN)~~ Chinese introduction to RPV and RPV technology came during the Vietnam war when a number of US photoreconnaissance drones were lost over the mainland (figure 11). Many of these platforms were recovered by the Chinese in relatively good condition. A PRC drone program has reportedly been underway since 1970 (figure 12). There is no information available at this time to suggest that the ultimate goal of this program is the development of a photoreconnaissance drone; however, if not, it is likely to be an eventual offshoot. Use of drones in a photoreconnaissance role is a relatively inexpensive proposition both in terms of platform costs and human life. The small size of the drone and its maneuverability enhance its survivability. Guidance control is the area where the Chinese may encounter the most difficulty in their drone program. There appears to be little, if any, progress in duplicating the guidance systems of the recovered US drones. Most likely this program has not received a high enough priority to justify expenditure of large amounts of resources. Although the dividends from a successful photoreconnaissance drone program would offset the costs, it is highly unlikely that the Chinese, in the context of the Four Modernizations priorities, can afford the luxury of photoreconnaissance drones at this time.

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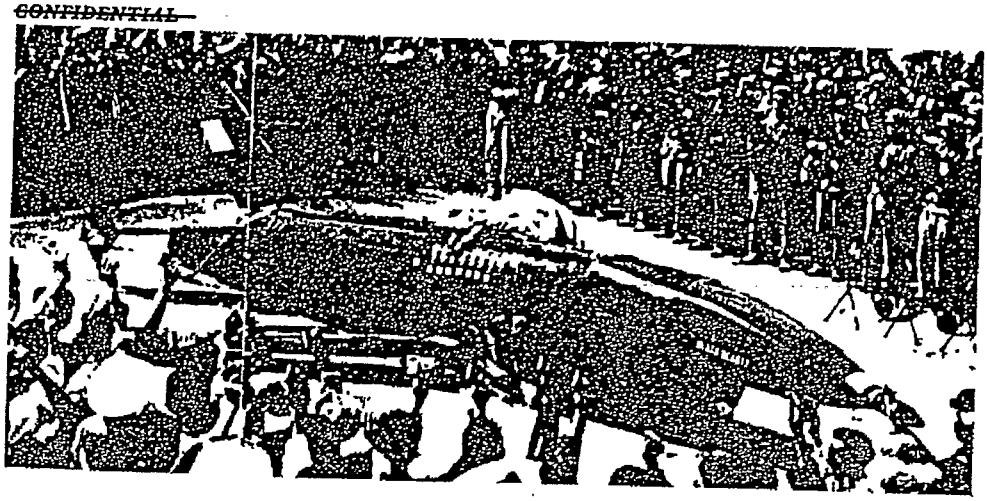

Figure 11. (U) US RPV (Drone)

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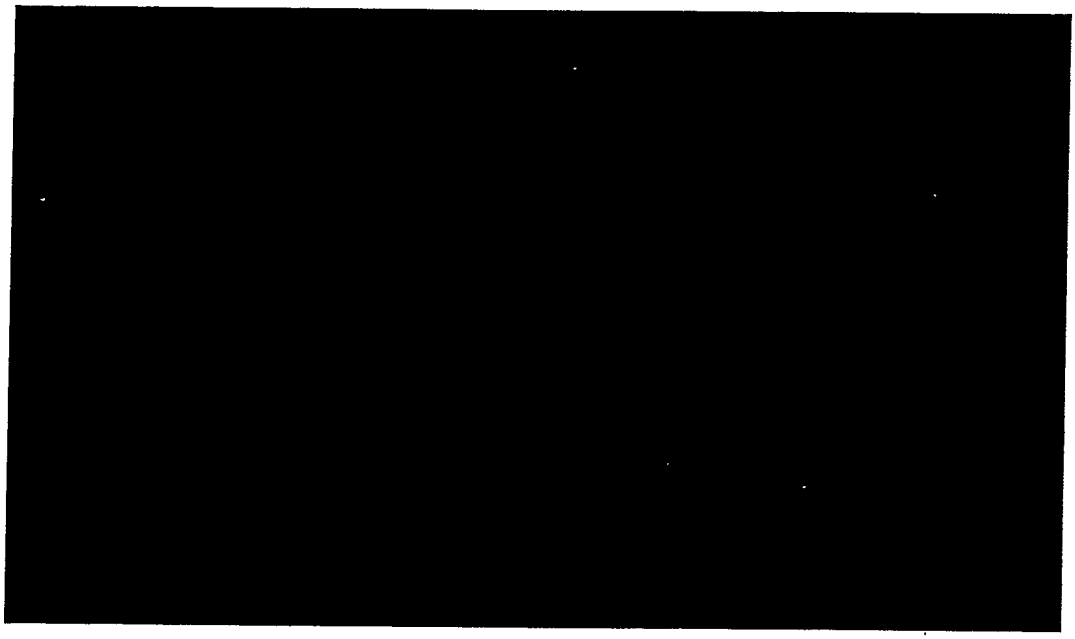

b. Camera Systems (b)(1)

~~(S/WNINTEL/NOFORN)~~ High-performance photoreconnaissance platforms are only as good as their associated camera systems. Unless camera systems compatible with higher-speed platforms are developed, the increased survivability afforded by an aircraft like the XIAN-A will be reduced. According to recent information, China is presently developing two new camera systems. One is an indigenously designed system for use on fighter-type aircraft. [redacted] The other camera is reportedly a copy of the system used in U-2 aircraft. Five US-built Taiwan Air Force U-2s were downed over the mainland during the 1960s. Most likely, elements of the onboard camera systems were recovered intact. Further details are not known; however, the high-flying XIAN-A would be a possible platform choice for this development.

~~(C/NOFORN)~~ There are indications that the Chinese have approached several industrialized nations for, and have received, a variety of photo equipment for use in their military reconnaissance satellite program. The extent of foreign assistance in the area of tactical reconnaissance, if any, is not known. Individual items of photographic hardware high on China's shopping list probably include aerial camera systems, precision optics, and higher-quality film. Because there are no trade restrictions on these types of items, they are readily available to the Chinese on the open market.

c. Processing and Exploitation

~~(C/WNINTEL/NOFORN)~~ Currently, the weakest link in the tactical reconnaissance cycle is the processing phase, specifically, the need to make mosaics for exploitation. Some form of in-flight processing would significantly decrease processing time; however, for the near term, better camera systems, infrared film, and advanced techniques are needed to reduce processing time. Photointerpreters can then conduct their analysis from film positives on a light table and by using single prints. The reduced need for mosaics alone could shorten processing time by about 50 percent. Use of better quality film, chemicals, and processing procedures could further reduce processing time. Once processing time is adequately reduced, the system will be more responsive to the needs of command authorities. Improvements in the area of exploitation will come about when the PI is given a good image to interpret. Improvements in optical equipment such as light/magnification tables are expected. Again, much of this type of equipment is readily available on the open market, with Japan being the most likely source. At the tactical level, mensuration will continue to be done manually. A centralized facility having the capability to perform more precise mensuration and enhancement techniques on selected photography would be a valuable addition to the

overall Chinese photoreconnaissance program. It is possible that such a center already exists, having its beginning in the photoreconnaissance satellite or aerial survey programs. Somewhat timely dissemination of finished photoreconnaissance items is possible now because of the establishment of a theater commander in the conflict area. An official from Beijing is normally assigned as the Senior Command Authority. With photoreconnaissance resources close to decisionmakers, the distance and time required for disseminating is minimal. With the scope of modern warfare changing, the consequences of decisions are more serious. This may require that the national command authorities in Beijing be more actively involved in the decisionmaking process, even at the theater level. This would require timely dissemination of information from the battlefield to Beijing. Improved dissemination of photo-related information to higher headquarters could be accomplished by acquiring more sophisticated electronic communication equipment, such as high-speed facsimile systems. This would allow national-level authorities to view film first hand in a timely fashion during the decisionmaking process.

4. CONCLUSION - CAPABILITIES ASSESSMENT

~~(S/WN INTEL/NOFORN)~~ China's capability to conduct tactical air reconnaissance is considered marginal when compared to the spectrum of likely tactical situations. This capability is characterized by obsolescent camera systems, time-consuming processing and evaluation methods, and airborne platforms whose probability of surviving in a high-threat environment is very low. Reconnaissance units can adequately fulfill tactical requirements during routine peacetime and exercise operations and would probably have a high rate of success during combat operations where the air defense environment is minimal, e.g., as in the recent Sino-Vietnam conflict. Against a highly mobile and well-defended enemy such as the Soviet Union, China's tactical reconnaissance capability drops off significantly, suffering both from a lack of near-real-time interpreting capability and highly vulnerable airborne collection platforms. The Chinese are apparently well aware of present deficiencies and have embarked on a program to upgrade their photoreconnaissance systems from aircraft to cameras and processing equipment. When widely deployed, these new systems should somewhat improve aircraft survivability and provide faster cycling time for the intelligence product.